

REMARKS

Claims 1, 3, 5, 6, 8 – 10 and 12 – 16 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Claims 1, 8 and 13 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. This rejection is respectfully traversed.

The Examiner has asserted that claims 1, 8 and 13 contain subject-matter that was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. More specifically, the Examiner has asserted that neither the specification nor the figures contain a reference to activation of cylinders based on a vehicle speed threshold.

Each of claims 1, 8 and 13 have been amended herein to provide that at least one of the cylinders is activated when the vehicle speed achieves a threshold. Applicants respectively note that the specification, as originally filed, provides explicit support for the above-described features. More specifically, Page 5, Lines 24 – 26 of the original specification provide that “[i]t is anticipated that control can monitor a vehicle speed. If the vehicle speed has achieved a threshold, control activates one or more of the cylinders 18 of the engine 12.”

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 1, 3, 5 and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tamai et al. (U.S. Pat. No. 6,307,277) in view of Bhavsar (U.S. Pat. No. 6,691,807). This rejection is respectfully traversed.

Claim 1 includes detecting a braking condition of the vehicle, deactivating at least one of the cylinders while maintaining at least another of the cylinders active in response to the braking condition and operating the electric machine in the generator mode during the braking condition to charge the battery. As noted by the Examiner, Tamai fails to teach or suggest maintaining at least another of the cylinders active in response to the braking condition.

Tamai discloses a fuel management control system for a traditional hybrid vehicle, wherein the system regulates fuel on/off transitions of the engine upon deceleration of the vehicle (Col. 2, Lines 38 – 40). Once fuel and spark are cut to all of the cylinders, the engine is kept spinning and transmission downshifts are performed with the aid of an electric machine, until the transmission is dropped to neutral (Col. 2, Lines 39 – 49). Accordingly, Tamai fails to teach or suggest maintaining at least another of the cylinders active in response to the braking condition.

Bhavsar fails to cure the deficient teachings of Tamai. More specifically, Bhavsar discloses a hybrid vehicle system that is powered by an electric motor 14 and an engine 16, which provide a total torque output to propel the vehicle. A propulsion control 24 calculates the overall drive torque demand partially based on the vehicle speed and determines the percentage of the overall drive torque demand that is to be provided by

the electric motor 14 and the percentage that is to be provided by the engine 16 (Col. 5, Lines 35 – 47).

If the percentage of drive torque that is to be provided by the engine 16 is not achievable using less than all of the cylinders of the engine 16, the engine 16 is operated using all of the cylinders in an internal combustion engine (ICE) mode (Col. 5, Lines 60 – 67, and Steps 56 and 60 of Figure 3). If the percentage of drive torque that is to be provided by the engine 16 is achievable using less than all of the cylinders of the engine 16, the engine is operated in the variable displacement engine (VDE) mode, thereby conserving fuel (Col. 6, Lines 6 – 13, and Steps 56 and 62 of Figure 3). The control strategy of Bhavsar is intended to split the drive torque requirements between the electric motor and the engine, while preventing the engine from changing between the ICE and VDE modes, thereby inhibiting adverse NVH (Col. 2, Lines 8 – 11, Col. 6, Lines 24 – 28, and Col. 7, Lines 15 – 19).

Other than mentioning the presence of a brake pedal (Col. 5, Line 3), Bhavsar is completely silent as to braking of the vehicle, and is specifically silent as to regenerative braking of the vehicle. In fact, there is no explicit or implicit discussion of operation of the engine during vehicle braking. Moreover, there is specifically no mention of deactivating at least one cylinder in response to a braking condition, maintaining at least another of the cylinders active in response to the braking condition or operating the electric machine in the generator mode during the braking condition to charge the battery within the entire disclosure of Bhavsar.

It is furthermore noted that the Examiner's statement on Page 4, Lines 4 – 6 of the present Office Action that "at least another of the cylinders would be maintained

active in response to the braking condition in accordance with the teachings of Bhavsar et al." (emphasis added) is not only inaccurate, it is misleading. As discussed in detail above, Bhavsar is completely silent as to braking of the vehicle, and is specifically silent as to maintaining at least one cylinder active in response to a braking condition.

In view of the foregoing, it is respectfully asserted Bhavsar fails to cure the deficient disclosure of Tamai.

Furthermore, it is respectfully asserted that although the person skilled in the art is presumed to know the art, the art in question is only that which he or she would have selected without the advantage of hindsight or knowledge of the invention. *Union Carbide Corp. v. American Can Co.*, 220 USPQ 584 (Fed. Cir. 1984). In making this obviousness rejection, the Examiner improperly uses hindsight.

As asserted above, and as admitted by the Examiner, Tamai fails to teach or suggest maintaining at least another of the cylinders active in response to the braking condition. As discussed in detail above, although Bhavsar is completely silent as to braking of the hybrid vehicle disclosed therein. Instead, the disclosure of Bhavsar is wholly focused on splitting the drive torque requirement between an electric machine and an engine, while operating the engine in a reduced cylinder mode as consistently as possible. Accordingly, the Examiner has used the features of the present invention as a road map in an attempt to justify the combination of Tamai and Bhasvar, where Bhasvar is completely silent as to vehicle braking. Therefore, the combination of Tamai and Bhasvar is based on improper hindsight.

In view of the foregoing, reconsideration and withdrawal of the rejection are respectfully requested.

Each of claims 3, 5 and 6 depend from claim 1, which defines over the prior art, as discussed in detail above. Therefore, claims 3, 5 and 6 also define over the prior art, for at least the reasons discussed with respect to claim 1, and reconsideration and withdrawal of the rejections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 102 AND § 103

Claims 8 – 10 and 12 – 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Tamai et al. (U.S. Pat. No. 6,307,277) in view of Bhavsar (U.S. Pat. No. 6,691,807).. This rejection is respectfully traversed.

With regard to claims 8 and 13, Applicant notes that each includes detecting a braking condition of the vehicle, deactivating at least one of the cylinders while maintaining at least another of the cylinders active in response to the braking condition and operating the electric machine in the generator mode during the braking condition to charge the battery. As noted by the Examiner, Tamai fails to teach or suggest maintaining at least another of the cylinders active in response to the braking condition. Bhavsar fails to cure the deficient teachings of Tamai.

Applicant incorporates the above discussion with respect to claim 1. As discussed in detail above, the system of Tamai deactivates all of the cylinders during regenerative braking. As also discussed in detail above, Bhavsar is completely silent as to braking and is wholly focused on splitting the drive torque requirement between an electric machine and an engine, while operating the engine in a reduced cylinder mode as consistently as possible. Furthermore, the combination of Tamai and Bhavsar is

improperly based on hindsight, in view of the fact that neither reference discloses maintaining at least one cylinder active during the braking condition. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

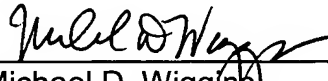
Each of claims 9, 10, 12 and 14 – 16 depend from one of claims 8 and 13, which define over the prior art, as discussed in detail above. Therefore, claims 9, 10, 12 and 14 – 16 also define over the prior art, for at least the reasons discussed with respect to claims 8 and 13, and reconsideration and withdrawal of the rejections are respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: August 11, 2006

By: 
Michael D. Wiggins
Reg. No. 34,754

GENERAL MOTORS CORPORATION
Legal Staff
Mail Code 482-C23-B21
P.O. Box 300
Detroit, MI 48265-3000